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Egg Preservation.

N. C. COLLEGE OF AGRICULTURE AND MECHANIC ARTS.

THE NORTH CAROLINA

AGRICULTURAL EXPERIMENT STATION

UNDER THE CONTROL OF THE

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J. S. JEFFREY ..... Poultryman.
B. F. WALTON ..... Assistant in Field Experiments.
J. C. KENDALL ..... Assistant Dairy Husbandry.
A. F. BOWEN ..... Bursar.

The Director's office is in the Agricultural Building, Raleigh: the experiment grounds and laboratories being at the Agricultural College, just west of town and on the street car line.

Visitors will be welcome at all times, and will be given every opportunity to inspect the work of the Station. Bulletins and Reports are mailed free to all residents of the State upon application.

Address all communications to

THE AGRICULTURAL EXPERIMENT STATION,
RALEIGH, N. C.

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Egg Preservation.

By J. S. Jeffrey, Poultryman.

Spring with its abundant supply of eggs, and the consequent lower price, naturally turns our attention to some means of keeping them for use when prices will be higher and the eggs difficult to get, even at an advanced price.

That eggs can be kept for several months in good condition has been proved beyond question and has been so successfully done that it has assumed gigantic proportions from a commercial standpoint, and at one time during the past winter we heard grave complaints of some of the large packing houses cornering the market on storage eggs and forcing the price up three or four cents per dozen and netting themselves an additional profit of about a quarter of a million dollars on the transaction.

For commercial purposes cold storage has superseded all other methods, but the farmer and the housekeeper seldom have cold storage facilities and must depend on some other method, and it is to try and help this class that the subject has received so much attention from Experiment Stations for the last few years.

Reports of this work have been published by several Stations, and before taking up the work here I will give a short review of some of the methods tried and the results obtained.

Preservatives may be roughly divided into two classes, viz: liquid and dry preparations, and I have no hesitation in saying, both from my own observations and the reports of others, that the liquid preparations are far superior to the dry ones, as even where the eggs packed in the latter way have kept fairly fresh, they always present a shrunken appearance, while those in the liquid preparations come out full and in many cases can hardly be distinguished from a new laid egg.

The liquid methods also have the advantage in cost of preparation over most of the dry methods.

The Rhode Island Station (Report for 1900) gives the results of experiments in this line, eleven different preservatives being used, as follows:

1. Water Glass (10 per cent. solution).
2. Dry Salt.
3. Lime Water and Salt.
4. Vaseline.
5. Dry Wood Ashes.

6. Ground Gypsum.
7. Powdered Sulphur.
8. Brimstone Fumes and Sulphur.
9. Permanganate of Potash.
10. Salicylic Acid.
11. Salt Brine.

The eggs in numbers 1 and 3 were all good and both these methods were recommended, but the balance were, without exception, bad, though it was stated that the vaseline treatment might give good results if the eggs were not kept for so long a period (about ten and a half months). In subsequent work water-glass was used in different strength solutions, varying from 10 per cent to 3 per cent, and with varying success. In some cases the eggs did not keep in the 10 per cent solution and kept in the 3 per cent. This, I think, shows that the condition of the eggs when put up is almost as important as the preservative used. This will be referred to later on.

In experiment number 10 (Salicylic Acid) is the same preservative used by us, but the method of using was different as well as the results. About $1\frac{3}{4}$ oz. of salicylic acid were dissolved in alcohol and the solution diluted with one quart of water. The eggs were left in this solution about one hour and were then packed in dry sand, and at the end of the period all the eggs were bad.

The reports of the Ontario Agricultural College for 1899 and 1900 give the results of experiments in egg preservation. Eight different preservatives were used, as follows:

1. Water-Glass (one part in six of water).
2. Water-Glass (one part in eight of water).
3. Water-Glass (one part in ten of water).
4. Lime water and salt.
5. Vaseline.
6. Common Salt.
7. Dry Oats.
8. Pure Water-glass.

The eggs from number 1 were reported as the best with number 2 slightly inferior in flavor and number 3 not equal to number 2.

The lime solution used in number 4 was not considered as good as the water-glass solutions, as the eggs had a slight taste of the lime.

In the lot treated with vaseline all the eggs were good, but had absorbed the taste of the vaseline.

In those packed in salt a small percentage were bad and all had evaporated badly.

Number 7 were musty and showed as much evaporation as those in the salt.

Number 8. In this the eggs were dipped in pure water-glass and

dried and then packed in a regular egg case. They were fairly well preserved but lacked flavor. Any method where the eggs are coated and then packed after drying requires so much labor that the expense is greater than in the liquid preparations.

The Experiment Farm at Ottawa, Canada, also compared water-glass and the lime water and salt solution and reversed the results given above, stating that the lime water and salt gave better results.

METHODS TESTED.

In our own experiments we employed ten different methods, as follows:

1. Ten per cent solution of water-glass (9 parts water and 1 part water-glass).
2. Twenty per cent solution of water-glass.
3. Lime and salt solution.
4. Lime and salt as in number 3, with "British Egg Preserver" (borax and sodium bicarbonate) added.
5. Water solution of Salicylic acid: one ounce of acid to one gallon of water.
6. Salicylic acid, cotton-seed oil and alcohol: ½ pound of salicylic acid dissolved in one quart of alcohol and mixed with ½ gallon of cotton-seed oil. The eggs were dipped in this and dried and packed in cottonseed hulls.
7. Salicylic acid and cotton-seed oil: used as in number 6.
8. Eggs dipped in melted paraffin and packed in cotton-seed hulls.
9. Eggs dipped in collodium, dried and packed in cotton-seed hulls.
10. Eggs dipped in solution of gum arabic, dried and packed in cotton-seed hulls.

RESULTS.

1. The ten per cent solution of water-glass was made by mixing one part of water-glass with nine parts of water that had been boiled. The solution was put in a crock and the eggs were put in it every day as they were gathered till the crock was filled, care being taken to have the solution at least two inches deep over the eggs. The eggs were put up the first part of June and we began to use them about December 15th. They were tested from that time till the following May. The eggs were all good. Some of those used in December so closely resembled fresh eggs that it would take an expert to tell which were the fresh eggs and which were the packed ones after they were cooked.

2. The solution was found to be too strong, as some of the eggs would not sink in it even the day they were laid and the quality of

the eggs was no better than those in number 1, the whites in some being slightly coagulated. All eggs were good, however. The extra cost of the solution and the trouble of the eggs floating were the objections to it.

3. The lime and salt solution was made by slaking 4 pounds of good lump lime and while hot stirring in two pounds of common salt. After cooling add five gallons of boiled water, stir thoroughly several times the first day and let settle, using only the clear liquid. The solution may be poured over the eggs or they may be put in it from day to day as gathered. The eggs in this lot were equally as good as those in the water-glass solution, none being bad. They were quite satisfactory to use for table purposes.

4. This solution (lime water and salt and "British Egg Preserver") gave good results but it could not be seen that the addition of the preserver gave any returns for the money it cost and trouble of using.

5. Water solution of salicylic acid, one ounce of acid to one gallon of water, gave good results, all the eggs being good. It did not, however, leave the eggs in as good condition as either the water-glass or lime water and salt solutions, as the acid weakened the shells, some of them, especially those at the bottom of the crock, being so thin that they had to be handled very carefully and very few of them were fit to pack in the regular egg cases. It might be that a weaker solution would preserve the eggs and not have so bad an effect on the shells.

Preservatives number 6, 7, 8, 9 and 10 can not be reported on as to efficiency, as rats got into the building where the eggs were stored and destroyed them. From the experience had with them and with other preservatives of a similar character, we feel reasonably safe in saying that they are not as satisfactory as the liquid preparations, because of the extra labor in putting up and the evaporation that takes place, leaving the eggs shrunken in appearance when broken.

Many people think that an egg, encased as it is in a shell, may be kept anywhere without injury, but this is far from being the case, as an egg will absorb odors almost as quickly as milk and butter. The shell, which appears to the casual observer to be solid, is in reality full of small holes or canals, through which the air passes, so that if the air be tainted the egg will naturally become tainted also. From this we see that it is necessary to keep the nests clean, and after the eggs are gathered keep them where they will not be subject to objectionable odors, such as onions, cabbage, kerosene or other things that will taint them. Eggs will keep for a considerable time if they are kept where the air is pure and fresh, and if it is rather damp they will not shrink so fast as in dry, warm air. The greater success which now is had with the cold storage of eggs is due largely to the packers having realized the susceptibility of eggs to the surround-

ing conditions and where formerly they were put up in the same room with all sorts of vegetables, butter and cheese, they now have separate rooms for the eggs and the greatest care is taken to have the room scrupulously clean and the air pure and free from all odors.

TESTING EGGS.

In putting up eggs for future use great care should be used to have them in as good condition as possible. Never use any that have been soiled or that are cracked, and if not absolutely sure that they are perfectly fresh they should be candled or tested.

This is done by holding the egg to the light in such a way that you can see through it. If fresh the egg will be perfectly clear, and if any cloudiness is seen the egg should be discarded. The air cell at large end of the egg should also be observed, as the size of it indicates the age of the egg. In a new-laid egg no air cell can be seen, but as the egg gets older it evaporates and the air cell increases in size.

A convenient tester can be made with a box about ten inches square and eighteen inches high. The bottom should be left out and a piece of tin with a hole in the center about the size of the top of the lamp chimney used for a top. Cut a hole a little smaller than and about the shape of an egg in one side opposite where the flame of the lamp will come. A reflector on the side opposite the hole will increase the strength of the light and make it easier to tell quickly whether the egg is clear or not. Place the box over a lighted lamp, hold the egg to the hole and you can tell at once if the egg is clear. The room should be darkened when using the tester.